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string. Then $\cos^2 a + \cos^2 b = \sin^2 c$, and $\cos a . \cos\phi + \cos b \sin\phi = \cos c \tan a$, (dividing x and y by $z \tan a$). Combining the first of these equations with that obtained by squaring the second, we find $\cos a \sin\phi - \cos b \cos\phi = \pm \sqrt{[1 - \cos^2 c \sec^2 a]}$. Thus

$$\cos a = (\xi - x)/(l - s) = \pm \sin\phi \sqrt{[1 - \cos^2 c \sec^2 a]} + \cos c . \tan a . \cos\phi;$$
$$\cos b = (\eta - y)/(l - s) = \mp \cos\phi \sqrt{[1 - \cos^2 c \sec^2 a]} + \cos c . \tan a . \sin\phi.$$

Since x, y, z, s, $\cos c$ are all known functions of ϕ, these equations furnish $d\xi$ and $d\eta$ in terms of ϕ and $d\phi$, and thus the problem of finding σ is reduced to a quadrature.

NOTES AND NEWS.

Mr. C. H. Forsyth of Michigan University has accepted the chair of mathematics in Eureka College, Eureka, Illinois.   M.

Mr. C. A. Barnhart, assistant in the University of Illinois, has accepted the chair of Mathematics in Carthage College, Carthage, Illinois.   M.

Dr. R. K. Morley, instructor in the University of Illinois, has accepted an assistant professorship of mathematics in Worcester Polytechnic Institute, Worcester, Mass.   M.

Dr. G. F. McEwen, instructor in mathematics in the University of Illinois, has accepted a position in the Marine Biological station of the University of California. This station is located at Lajolla, Cal.   M.

A circular, bearing the signature of about seventy prominent mathematicians, calls attention to the fact that during August of the present year Professor Felix Klein of Göttingen, Germany, will reach the fortieth anniversary of his appointment as professor of mathematics in the University of Erlangen. It is proposed to give him some token of the thanks and the good wishes of his fellow mathematicians in view of his great services to mathematical progress, and of his excellent work as a mathematical teacher. Attention is called especially to the great influence of the so-called *Erlanger Programm*, which was translated into English by Professor Haskell, and which was published in the *Bulletin of the New York Mathematical Society*, volume 2 (1893), page 215, under the title, "A Comparative Review of Recent Researches in Geometry." It may be added that Klein is the president of the International Commission on the Teaching of Mathematics, which is expected to report to the International Congress of Mathematicians at its fifth meeting, which is to be held at Cambridge, England, during the coming August.   M.

During the Summer Session of the University of Illinois, June 17 to August 9, 1912, the following mathematical courses will be offered: Advanced algebra, plane trigonometry, analytic geometry, differential calculus, integral calculus, differential equations, and projective geometry. Graduate credit may be granted only for work in the last two of these courses.   M.

It may interest mathematicians to learn of a valuable series of card-catalogue cards which the Library of Congress will have ready for distribution next July.   This series is the beginning of a Dictionary Catalogue of all articles in the *Encyklopädie der Mathematischen Wissenschaften* and *Encyclopédie des Sciences Mathématiques*.   Brown University has already supplied copy for the catalogue of all parts of these works which have been published.   It will continue to furnish copy for further cards as the various parts of the encyclopædias appear.   R. C. ARCHIBALD.

The latest number of the *Revue Semestrielle*, covering the period of six months from April to October, 1911, classifies the mathematical literature which appeared during this period under about 250 different headings, excluding the sub-headings represented by small letters of the Roman and the Greek alphabets.   The largest number of references appear under the headings of biography and various considerations on the philosophy and the teaching of mathematics.   The other headings under each of which there are more than twenty references to literature appearing during the given six months are as follows: Functions of real variables, series and infinite developments, electrodynamics, thermodynamics, light, surfaces in general and lines traced on a surface, theory of equations, functional equations, calculus of probability, systems and families of surfaces, elasticity, determinants, integral calculus, algebraic and circular functions, particular linear differential equations, indeterminate analysis of order higher than the first, plane and spherical curves, dynamics of solids and of material systems, rational hydrodynamics, and the history of mathematics in the twentieth century.   The numbers of these references are useful to determine the fields of greatest present mathematical activity.   Other facts must, however, be also considered.   M.

BOOKS.

Non-Euclidian Geometry. A Critical and Historical Study of Its Development.   By Roberto Bonola, Professor in the University of Pavia.   Authorized English translation with additional appendices, by H. S. Carslaw, Professor in the University of Sydney, N. S. W., with an introduction by Federigo Enriques, Professor in the University of Bologna.   8vo.   Red cloth. xii+263 pages.   Price, $2.00.   Chicago: The Open Court Publishing Co.

This is, as it purports to be, a critical and historical study of non-Euclidean geome-